

# Biotechnology

**Code:** CHEM3030

**Extent:** 20–25 cr

**Language:** English

**Professor in charge:** Sandip Bankar

**Target group:** Master's students

**Application procedure:** Open for all students of Aalto University.

**Quotas and restrictions:** Please note, that in some courses the number of participants can be limited. Then major students (Biotechnology) have the priority.

**Prerequisites:** While making your study plan, you should verify that you have the prerequisites needed for the courses.

## Objectives

The Biotechnology minor gives multidisciplinary knowledge of biotechnology and engineering with applications. The minor gives an understanding of molecular level biological phenomena, including modeling and application. At the core of the teaching are biochemistry, microbiology and bioprocess engineering. The minor also offers courses covering genetic engineering and synthetic biology, and development of biotechnological processes. The minor Biotechnology applies knowledge in the fields of biotechnology, chemistry and process engineering.

## Learning outcomes

After completing the Biotechnology minor, the students have the competencies to:

1. Contribute to the integration of biotechnology to chemical and process engineering in generation of commercially interesting products
2. Suggest key methods for analysis in biotechnology based on the physiology of pro- and eukaryotic cells
3. Provide information on general unit operations and bioreactor performance with a contribution to selected quantification methods including modelling of cellular and enzymatic activities

## Content and structure of the minor

For the minor (20–25 credits) all students have to take the same compulsory studies of 15 cr. Additionally the student needs to select specialisation studies of 5–10 cr.

### Structure of the minor

Code	Name	Credits	Period
Mandatory courses		15	
<a href="#">CHEM-E3100</a>	Biochemistry	5	I
<a href="#">CHEM-E3120</a>	Microbiology	5	I
<a href="#">CHEM-E3140</a>	Bioprocess Technology II	5	II
Elective courses		5–10	
Choose so many courses below that the Minor will be at least 20 cr			
<a href="#">CHEM-E3150</a>	Biophysical Chemistry	5	III

CHEM-E3170	Systems Biology*	5	I V - V , e v e n y e a r s
CHEM-E3180	Concepts in Biochemistry	5	II - III
CHEM-E3205	Bioprocess Optimization and Simulation	5	I
CHEM-E3225	Cell- and Tissue Engineering*	5	III - I V , e v e n y e a r s
CHEM-E8115	Cell Factory	5	III
CHEM-E8120	Cell Biology**	5	II
CHEM-E8125	Synthetic Biology	5	I V - V

\*The number of students pursuing a minor that may take these courses depends on number of students taking these in their major. Course is offered even years.

\*\*CHEM-E8120 Cell Biology\*\* is prerequisite for CHEM-E3170 Systems Biology.